

PATENT SPECIFICATION (11)

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(54) PERFUMED BODIES OF COPOLYMERS OF ETHYLENE AND POLAR MONOMER

(71) We, HERCULES INCORPORATED, a Corporation of the State of Delaware, United States of America, of 110 Market Street, Wilmington, Delaware 19899, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to clear, perfumed thermoplastic resins suitable for the preparation of shaped objects from which the perfume odor emanates over a period of time at substantially a stable level.

A number of thermoformable perfumed compositions have been proposed heretofore. In particular, high and low density polyethylene and polyvinyl chloride perfumed molding powders have been sought. With the polyethylenes, however, only limited success has been obtained due to the almost total incompatibility of the perfume oil and the polymer, leading to exudation of the perfume from the polymer matrix. Moreover, the high melting point and consequent high molding temperatures required of some polyethylenes are so high as to cause damage to the perfume oil incorporated therein. With polyvinyl chloride it has apparently been found necessary to incorporate a filler to carry the perfume oil.

According to the invention a thermoplastic resin body is provided, which faithfully retains the odor of the perfume material contained therein, from which the perfume oil does not exude to a significant extent, and which consists essentially of a thermoplastic copolymer of ethylene and about 6 to 60% by weight of a polar vinyl monomer selected from (a) vinyl acetate, (b) ethyl acrylate, (c) methyl acrylate, (d) butyl acrylate and (e) acrylic acid, including the hydrolysed copolymer of ethylene and vinyl acetate, and about 1 to 30% by weight of the resin body of the perfume oil.

To be used successfully in perfumed plastics, a resin must have a low processing temperature so that more volatile components

of the perfume are not lost during processing. It should be sufficiently compatible with perfume oils so that the oil does not exude so rapidly as to wet the surface of the shaped body but it should have a degree of incompatibility that will permit the odor of the perfume to emanate from the body of plastic. On the practical side, the resin must be sufficiently inexpensive and durable to permit its use broadly in everyday, disposable items. In accordance with this invention, it has been found that the ethylene—polar vinyl monomer copolymers and terpolymers are excellently suited to the preparation of thermoformed resin bodies on each of the counts listed.

The copolymers used in the invention are those containing about 6 to 60% by weight of the polar vinyl comonomer, e.g. ethylene—vinyl acetate, ethylene—ethyl acrylate, ethylene—methyl acrylate, ethylene—vinyl alcohol (hydrolysed ethylene—vinyl acetate copolymer), ethylene—butyl acrylate and ethylene—acrylic acid copolymers. The preferred copolymers are ethylene—vinyl acetate with about 9 to 60% vinyl acetate and ethylene—ethyl acrylate with about 6 to 18% ethyl acrylate.

These resins are normally solid, relatively low molecular weight materials. They are moldable at relatively low temperatures, i.e., less than about 175°C., by any of the common molding techniques. Thus, they can be either compression or injection molded without reaching temperatures sufficient to damage the perfume components. In addition, they are themselves relatively odorless.

Resins of the type disclosed are commercially available on molding powder form. For example, ethylene—vinyl acetate copolymers are marketed by the Du Pont Company under the trade name "Elvax", by Arco Polymers under the trade name "Dylan" and by Exxon under the trade name "Dexxon". "Elvax" and "Dylan" are registered Trade Marks. Ethylene—ethyl acrylate copolymers are marketed by Union

Example 5

Specimens of ethylene—ethyl acrylate copolymer containing 18% of ethyl acrylate were compounded with about 10% by weight of the fresh floral mossy perfume oil on a two-roll mill at 250°F. These were injection molded into flat plaques at 320°F.

In the same manner specimens of ethylene—ethyl acrylate copolymer containing 8% of ethyl acrylate were compounded with 10% perfume at 275°F. and injection molded at 320—350°F.

In each case, the moldings exhibited the original perfume odor faithfully over an extended period of time without oiling out on the plastic surface.

Example 6

A specimen of low density polyethylene was compounded on a two-roll mill at 250°F. with about 10% by weight of the perfume employed in Example 5. This material was compression molded into a plaque at 265°F. The perfume odor was substantially unchanged, but the surface of the plaque was oily and wet to the touch.

WHAT WE CLAIM IS:—

1. A thermoplastic resin body consisting essentially of a thermoplastic copolymer of ethylene and about 6 to 60% by weight of a polar vinyl monomer selected from (a) vinyl acetate, (b) ethyl acrylate, (c) methyl acrylate, (d) butyl acrylate and (e) acrylic acid, including the hydrolysed copolymer of ethylene and vinyl acetate, and about 1 to 30% by weight of the resin body of perfume oil.

2. The thermoplastic resin body of claim 1 wherein the thermoplastic copolymer is comprised of ethylene and about 6 to 18% by weight ethyl acrylate.

3. The thermoplastic resin body of claim 1 wherein the thermoplastic copolymer is comprised of ethylene and about 9 to 60% by weight of vinyl acetate.

4. A thermoplastic resin body substantially as described in any of the foregoing Examples 1 to 5.

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